

Claims

We claim:

1. A method for performing IP telephony, comprising:

5 receiving a data packet from an IP telephone, wherein the data packet comprises a private source IP address, a source port number, and destination information associated with an IP device;

performing a network address persistent port translation (NAPPT) on the data packet; and

10 sending the data packet to the IP device.

2. The method of claim 1, wherein said performing a network address persistent port translation (NAPPT) on the data packet comprises changing the private source IP address to a public source IP address while leaving the source port number
15 unchanged, and wherein the public source IP address and the source port number may be used to uniquely identify the IP telephone.

3. The method of claim 1, further comprising:

20 receiving a data packet from the IP device, wherein the data packet comprises a public destination IP address, a destination port number, and source information, wherein said public destination IP address comprises said public source IP address, and wherein said destination port number comprises said source port number;

performing a network address persistent port translation (NAPPT) on the data packet received from the IP device; and

25 sending the data packet received from the IP device to the IP telephone.

4. The method of claim 3, wherein said performing a network address persistent port translation (NAPPT) on the data packet received from the destination comprises using the public destination IP address and the destination port number to

uniquely identify the IP telephone, and changing the public destination IP address to the private source IP address while leaving the destination port number unchanged.

5 5. The method of claim 3, wherein said source port number and said destination port number are in an assigned range of port numbers comprising ports which are not reserved for use by other IP protocols.

6. The method of claim 1, further comprising performing the following steps prior to said receiving said packet:

10 receiving an identifier from the IP telephone;

 determining if the identifier is valid; and

 if the identifier is valid, assigning a range of port numbers to the IP telephone based on the identifier, wherein the IP telephone is operable to use at least a subset of the range of port numbers to send or receive IP communications.

15 7. The method of claim 6, wherein said range of port numbers comprises ports which are not reserved for use by other IP protocols.

20 8. The method of claim 6, wherein the identifier comprises a vendor class identifier.

9. The method of claim 6, wherein said determining comprises:
 determining if a MAC ID for the IP telephone is valid; and
 if the MAC ID is determined to be valid, then determining if the identifier is valid.

25 10. The method of claim 6, wherein said identifier is comprised in a DHCP discover message, the method further comprising:

issuing a DHCP offer to the IP telephone if the identifier is determined to be valid, wherein the DHCP offer comprises DHCP lease information based on the validated identifier;

the IP telephone issuing a DHCP request in response to the issued DHCP offer;

5 storing the DHCP lease information in response to the issued DHCP request;

the IP telephone storing the DHCP lease information; and

the IP telephone enabling DHCP settings comprised in the DHCP lease information.

10 11. The method of claim 10,

wherein said DHCP lease information includes the range of port numbers and information indicating operational software for the IP telephone, the method further comprising:

15 the IP telephone executing the indicated operational software to enable said IP communications.

12. The method of claim 10,

20 wherein said DHCP lease information includes the range of port numbers and information indicating operational software for the IP telephone, the method further comprising:

the IP telephone issuing a request for the operational software;

providing the operational software to the IP telephone in response to the issued request; and

25 the IP telephone executing the provided operational software to enable said IP communications.

13. The method of claim 12, wherein the IP telephone issuing the request for the operational software comprises issuing a read request to a file transfer server, wherein

said file transfer server performs said providing the operational software to the IP telephone.

14. The method of claim 13, wherein the file transfer server comprises a TFTP
5 (Trivial File Transfer Protocol) server.

15. The method of claim 6, wherein the range of port numbers comprises one or more port numbers.

10 16. A system for performing IP telephony, comprising:
a network;
an IP telephone;
a Service Gateway, wherein the Service Gateway is operable to couple to the IP
telephone through the network;
15 wherein the Service Gateway is further operable to:
receive a data packet from an IP telephone, wherein the data packet
comprises a private source IP address, a source port number, and destination information
associated with an IP device;
perform a network address persistent port translation (NAPPT) on the data
20 packet; and
send the data packet to the IP device.

17. The system of claim 16, wherein, in performing a network address
persistent port translation (NAPPT) on the data packet, the Service Gateway is operable
25 to:

change the private source IP address to a public source IP address while leaving
the source port number unchanged, and wherein the public source IP address and the
source port number may be used to uniquely identify the IP telephone.

18. The system of claim 16, wherein the Service Gateway is further operable to:

receive a data packet from the IP device, wherein the data packet comprises a public destination IP address, a destination port number, and source information, wherein said public destination IP address comprises said public source IP address, and wherein said destination port number comprises said source port number;

perform a network address persistent port translation (NAPPT) on the data packet received from the IP device; and

send the data packet received from the IP device to the IP telephone.

19. The system of claim 18, wherein, in performing a network address persistent port translation (NAPPT) on the data packet received from the IP device, the Service Gateway is operable to:

use the public destination IP address and the destination port number to uniquely identify the IP telephone; and

change the public destination IP address to the private source IP address while leaving the destination port number unchanged.

20. The system of claim 18, wherein said source port number and said destination port number are in an assigned range of port numbers comprising ports which are not reserved for use by other IP protocols.

21. The system of claim 16, wherein, prior to said receiving said packet, the Service Gateway is further operable to:

receive an identifier from the IP telephone;

determine if the identifier is valid; and

if the identifier is valid, assign a range of port numbers to the IP telephone based on the identifier, wherein the IP telephone is operable to use at least a subset of the range of port numbers to send or receive IP communications.

22. The system of claim 21, wherein said range of port numbers comprises ports which are not reserved for use by other IP protocols.

23. The system of claim 21, wherein the identifier comprises a vendor class identifier.

24. The system of claim 21, wherein, in determining if the identifier is valid, the Service Gateway is operable to:

determine if a MAC ID for the IP telephone is valid; and
if the MAC ID is determined to be valid, then determine if the identifier is valid.

25. The system of claim 21, wherein said identifier is comprised in a DHCP discover message;

wherein the Service Gateway is further operable to issue a DHCP offer to the IP telephone if the identifier is determined to be valid, wherein the DHCP offer comprises DHCP lease information based on the validated identifier;

wherein the IP telephone is further operable to issue a DHCP request in response to the issued DHCP offer, store the DHCP lease information, and enable DHCP settings comprised in the DHCP lease information;

wherein the Service Gateway is further operable to store the DHCP lease information in response to the issued DHCP request.

26. The system of claim 25,
wherein said DHCP lease information includes the range of port numbers and information indicating operational software for the IP telephone;

wherein the IP telephone is further operable to execute the indicated operational software to enable said IP communications.

27. The system of claim 25,
wherein said DHCP lease information includes the range of port numbers and
information indicating operational software for the IP telephone;
wherein the IP telephone is further operable to issue a request for the operational
5 software;
wherein the Service Gateway is further operable to provide the operational
software to the IP telephone in response to the issued request; and
wherein the IP telephone is further operable to execute the provided operational
software to enable said IP communications.

10 28. The system of claim 27, further comprising:
a file transfer server;
wherein, in issuing the request for the operational software, the IP telephone is
operable to issue a read request to the file transfer server, wherein said file transfer server
15 is operable to provide the operational software to the IP telephone.

29. The system of claim 28, wherein the file transfer server comprises a TFTP
(Trivial File Transfer Protocol) server.

20 30. The system of claim 29, wherein the file transfer server is comprised in the
Service Gateway.

31. The system of claim 21, wherein the range of port numbers comprises one
or more port numbers.

25 32. A memory medium, wherein the memory medium is operable to store
program instructions which are executable to perform:

receiving a data packet from an IP telephone, wherein the data packet comprises a private source IP address, a source port number, and destination information associated with an IP device;

performing a network address persistent port translation (NAPPT) on the data packet; and

sending the data packet to the IP device.

33. The memory medium of claim 32, wherein said performing a network address persistent port translation (NAPPT) on the data packet comprises changing the private source IP address to a public source IP address while leaving the source port number unchanged, and wherein the public source IP address and the source port number may be used to uniquely identify the IP telephone.

34. The memory medium of claim 32, wherein the program instructions are further executable to perform:

receiving a data packet from the IP device, wherein the data packet comprises a public destination IP address, a destination port number, and source information, wherein said public destination IP address comprises said public source IP address, and wherein said destination port number comprises said source port number;

performing a network address persistent port translation (NAPPT) on the data packet received from the IP device; and

sending the data packet received from the IP device to the IP telephone.

35. The memory medium of claim 34, wherein said performing a network address persistent port translation (NAPPT) on the data packet received from the destination comprises using the public destination IP address and the destination port number to uniquely identify the IP telephone, and changing the public destination IP address to the private source IP address while leaving the destination port number unchanged.

36. The memory medium of claim 34, wherein said source port number and said destination port number are in an assigned range of port numbers comprising ports which are not reserved for use by other IP protocols.

5

37. The memory medium of claim 32, wherein the program instructions are further executable to perform the following steps prior to said receiving said packet:

receiving an identifier from the IP telephone;

determining if the identifier is valid; and

10 if the identifier is valid, assigning a range of port numbers to the IP telephone based on the identifier, wherein the IP telephone is operable to use at least a subset of the range of port numbers to send or receive IP communications.

38. The memory medium of claim 37, wherein said range of port numbers
15 comprises ports which are not reserved for use by other IP protocols.

39. The memory medium of claim 37, wherein the identifier comprises a vendor class identifier.

20 40. The memory medium of claim 37, wherein said determining comprises: determining if a MAC ID for the IP telephone is valid; and if the MAC ID is determined to be valid, then determining if the identifier is valid.

25 41. The memory medium of claim 37, wherein said identifier is comprised in a DHCP discover message, and wherein the program instructions are further executable to perform:

issuing a DHCP offer to the IP telephone if the identifier is determined to be valid, wherein the DHCP offer comprises DHCP lease information based on the validated identifier;

receiving a DHCP request from the IP telephone in response to the issued DHCP offer; and

storing the DHCP lease information in response to the issued DHCP request;

wherein the DHCP lease information comprises DHCP settings which may be
5 enabled by the IP telephone.

42. The memory medium of claim 41,

wherein said DHCP lease information includes the range of port numbers and information indicating operational software for the IP telephone; and

10 wherein the indicated operational software is executable by the IP telephone to enable said IP communications.

43. The memory medium of claim 41,

wherein said DHCP lease information includes the range of port numbers and
15 information indicating operational software for the IP telephone;

wherein the program instructions are further executable to perform:

receiving a request from the IP telephone for the operational software; and

providing the operational software to the IP telephone in response to the
issued request;

20 wherein the indicated operational software is executable by the IP telephone to enable said IP communications.

44. The memory medium of claim 43, wherein the IP telephone issuing the request for the operational software comprises issuing a read request to a file transfer
25 server, wherein said file transfer server performs said providing the operational software to the IP telephone.

45. The memory medium of claim 44, wherein the file transfer server comprises a TFTP (Trivial File Transfer Protocol) server.

46. The memory medium of claim 37, wherein the range of port numbers comprises one or more port numbers.

5

TO: "43" 9E9E0650